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(58) Field of Search

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**INT CL<sup>7</sup> H04N 5/272 5/275 7/14 7/15 9/75**

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(54) Abstract Title

**Extraction and replacement of background signals in communication systems**

(57) A communication system comprises a plurality of communication devices each of which may transmit signals to and receive signals from a selected one of the other devices. The signals may be audio or video signals. A background portion of the signal to be transmitted is removed (e.g. using chroma key if signal is video or a filter if the signal is audio) and is replaced by a selected signal representing a 'false' background. The 'false' background signal may be stored in the device, generated within the device, or supplied by an external source. The remaining main signal is transmitted along with the 'false' background signal, either together along the same communications channel after having been combined in the transmitting device, or transmitted separately along different channels. In the latter case, the combining is performed in the receiving device.

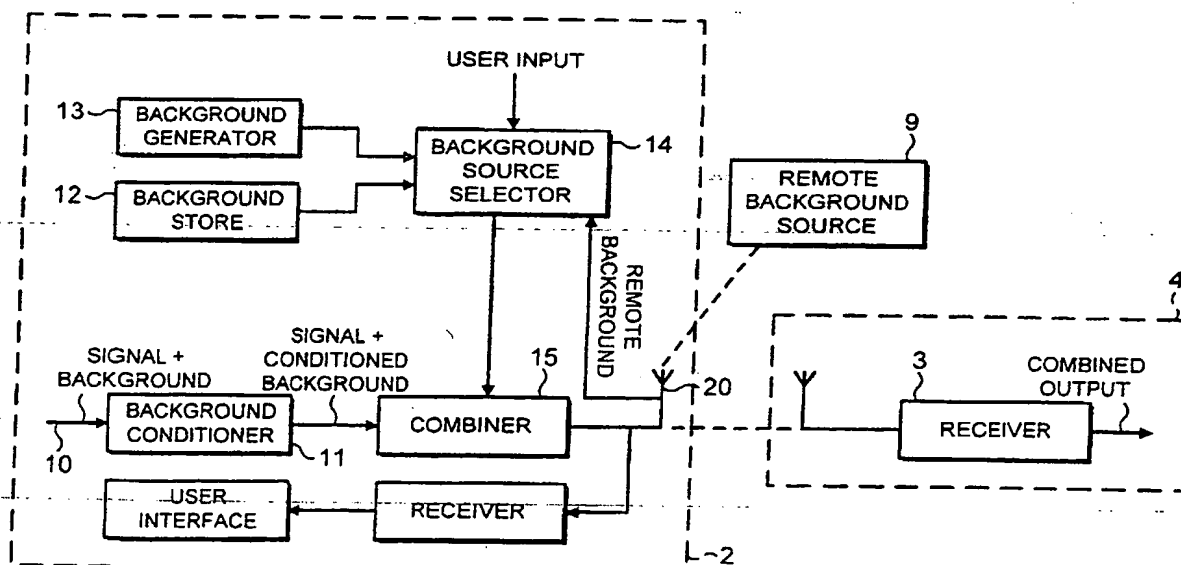


FIG. 2

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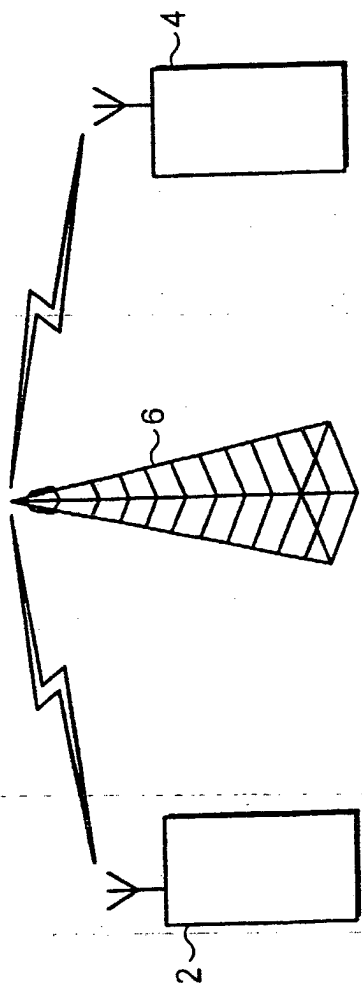


FIG. 1

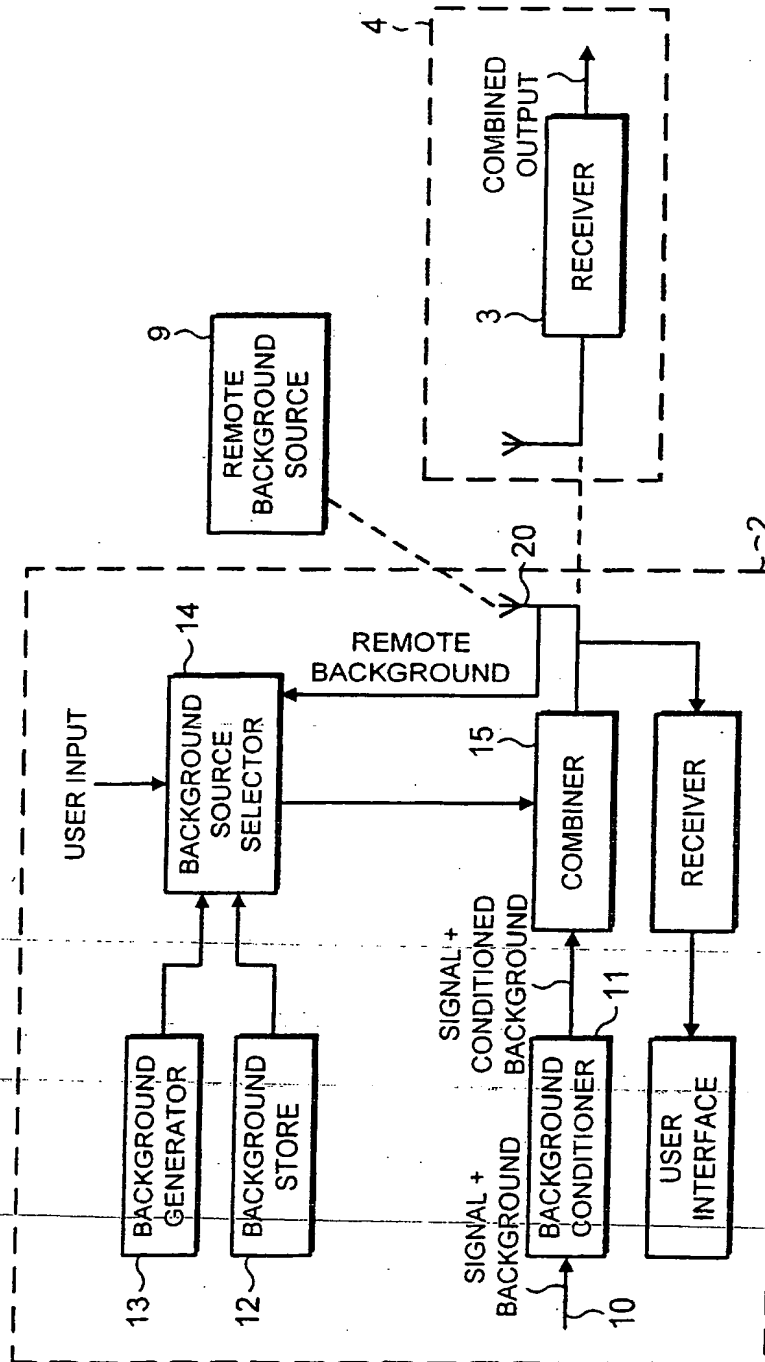


FIG. 2

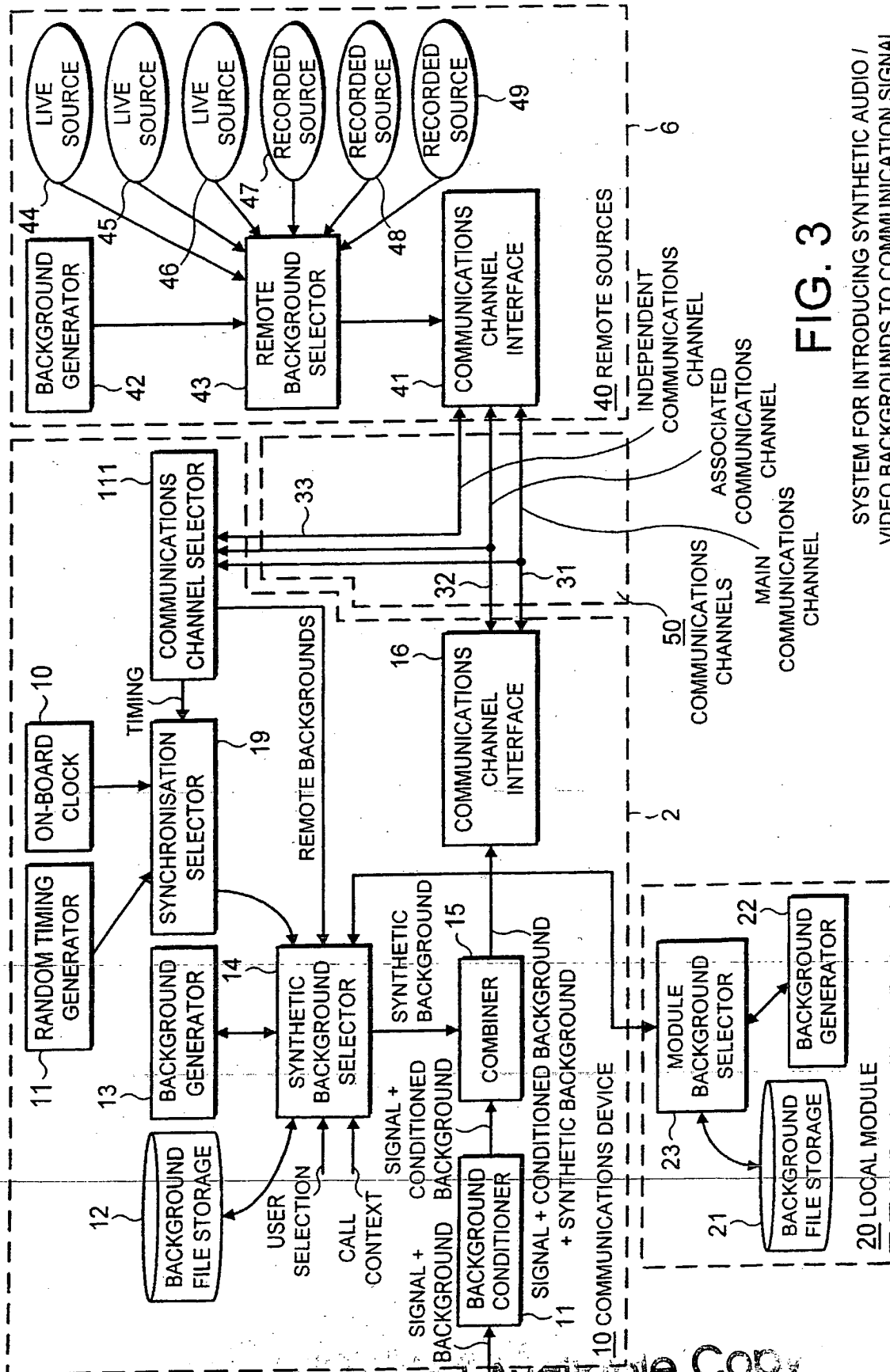


FIG. 3

SYSTEM FOR INTRODUCING SYNTHETIC AUDIO /  
VIDEO BACKGROUNDS TO COMMUNICATION SIGNAL

INTRODUCING BACKGROUND SIGNALS TO COMMUNICATION SYSTEMS

This invention relates to a system for the introduction of background signals to signals transmitted over communication systems and in particular to the  
5 introduction of such systems into personal communications systems such as telephones, mobile telephones, video phones etc.

Currently, communication systems such as telephones or video phones transmit an audio or an audio and video  
10 signal from one communication device via cables or RF transmission from one communication device to another. The audio and video signals will each consist of an information bearing "main" signal and associated "background" signal. In the case of audio signal, the  
15 main signal will be the part of the signal representing voice transmission and the background signal will be any background noise picked up by the microphone on the communication device being used. In the case of video transmissions, the main signal will usually be the image  
20 of a person speaking and the background signal will be the background against which he is standing. This may be a fixed background or a mobile background. Video transmissions will also include audio signals comprising main and background signals.

25 In each case, the background signal is inherently less information rich than the main signal and may not be wanted by the user of the communication device.

We have appreciated that users of communication devices may wish to replace the background audio or video  
30 signal with another background signal selected by the user of the communication device from a variety of on-board local and remote sources. This may be, for example, the background noise of an office environment to transmit with an audio signal or it may be video background of some

predetermined view, possibly with an associated audio background signal.

Accordingly, a preferred embodiment of this invention provides a communication device which can transmit a signal to at least one other communication device, and in which the transmitting signal comprises a main signal comprising information to be transmitted to the other communication device and a background signal comprising additional information. The background signals may be stored locally, generated locally, or may be live signals provided from another source. The backgrounds may be synchronised with a number of user selectable sources to appear real time or alternatively, may be deliberately randomised. A further option would be to use an external real time synchronisation source.

The invention is defined with more precision in the appended claims to which reference should now be made.

A preferred embodiment of the invention will now be described in detail, by way of example, with reference to the accompanying figures, in which:

**FIGURE 1** shows schematically a mobile communication system of the type in which the invention may be used;

**FIGURE 2** shows a communication system embodying the invention; and

**FIGURE 3** shows a more detailed block diagram of a system embodying the invention.

Figure 1 shows two mobile communication devices (2) and (4) for use in a cellular mobile communication system which can communicate via one or more cellular antennas (6). These mobile units are typically mobile phones. They may, however, be mobile video phones. The system could be a landline system using audio or video signals or it could be a satellite communication system.

In figure 2 a schematic block diagram of a communication device (2) such as a mobile phone is shown

for transmitting and receiving signals from a further mobile phone (4).

5       An input signal 10 is provided to a background conditioner unit (11). If the signal is an audio signal then the background conditioner will comprise some form of filtering to remove the local background noise to the voice signal. In the case of the video phone, the background conditioner will remove a known background against which a person is standing. This could operate by  
10       the well-known technique of chroma keying. This background conditioner then produces an output comprising a main signal plus conditioned background (i.e., substantially all original background removal). This signal is provided to a combiner (15).

15       Also received at combiner (15) is a background signal provided by a background source selector (14). This provides a signal in response to a user input of either a background store (12), a background generator (13) or a remote background source (9). The remote background  
20       source is in this particular example a broadcast remote background source which is received by an antenna (20) on the mobile unit (2) and from there provided to the background source selector (14).

25       The combiner unit (15) combines the background signal with the input from the background conditioner (11) in dependence on the form of communications channel being used. If there is a single communications channel then the background signal will be directly combined with the output of the background conditioner prior to  
30       transmission. If the communication system in use comprises e.g. a main communications channel and an additional communications channel such as in the GPRS  
35       mobile phone system, then the main signal output by the background conditioner and the background signal from the background source selector may be transmitted separately on the main communications channel and the additional

communications channel. In such a case, the mobile unit (4) to which the signal is directed would include in its receiver (3) a mechanism for combining the main signal with the background signal from the additional communications channel.

In the case of audio signals the combiner (15) will comprise a straightforward audio mixer which will mix the two signals together in a manner which will be well known to those skilled in the art. In the case of the main signal and the background signal being video signals then they will be combined by e.g. chroma keying which is a technique which will be well known to those skilled in the art.

Figure 3 shows a more detailed embodiment of the invention which uses a main communications channel (31) and an additional associated communication channel (32) which form part of a set of communication channels (30). In this example the communication device (2) is a mobile telephone and the communication channels (30) link it to a cellular station (6) by which it can communicate with another mobile phone or land phone.

As in Figure 2, the input signal which in this example is the audio signal will be provided to a background conditioner (11), the output of which is the main signal which comprises a signal plus conditioned background. The background conditioner (11) removes e.g. background noise by filtering. The main signal is then provided to a combiner (15) which receives a background signal (synthetic) from a background selector (14).

The inputs to the background selector (14) are a background file store (12), a background generator, for a remote background signal a local module 20 with background sources, or a remote background received via a communications channel (33) and selection is made between these three sources.



Selection can be made by a user selection input. Alternatively, a call context input can be used to control background selection. An example of call context selection might be where the user programs the communications device to select background "a" for caller "A", background "b" for caller "B" and so on. The external local module comprises a background file store (21), a background generator (12) and module background selector (23) which selects between backgrounds from either the background file store or the background generator in response to signals received from the mobile unit. This local module would be connected to the mobile phone (2) by a direct connection, typically with a socket provided on the phone or via an infrared or RF link for this input and the purpose of this would be to increase the range of backgrounds available to the user.

The remote backgrounds are provided via a communications channel (33) from a remote background selector (43) provided at the cellular station (6). This is able to select between backgrounds from a background generator (42), a number of live sources (44,45,46) or a number of recorded sources (47,48,49). The selected background is then provided to communications channel interface (41) which transmits the background on an independent communication channel (33) which is received at the mobile communication device (2) and provided to a communications channel selector (111) which then provides the background to the background selector (14).

The communications channel selector (111) also receives directly signals from the main communications channel (30) and the associated communications channel (32), and from these extracts timing data which is provided to a synchronisation selector (19). This also receives signals from an on-board clock (10) or a random timing generator (11). This synchronisation selector can then be programmed or controlled by the user to select an

appropriate one of the timing sources so that background information may be synchronised as appropriate. For example, it may be desired to synchronise backgrounds to real time by having a clock strike in the background. This could be done by synchronising a particular background that includes a clock with the on-board clock in the mobile communication device.

The random timing generator (11) can be used to ensure that when backgrounds are applied the times at which they start are randomised so that backgrounds do not always commence at the same point. This removes any predictability from the background being used. The timing from the main and associated communication channels (30) and (32) can also be used for synchronisation.

The combiner (15) provides the main signal plus the background signal to a communications channel interface. This sends the main signal on the main communications channel and the background signal on the associated communications channel. These are then received at a cellular station (6) by the communications channel interface (41). This can then transmit them on to the mobile unit for which the signals are intended. At the mobile unit for which they are intended, the main and background signals will be combined before being supplied to the user. In the case of an audio signal this will be by audio mixing. In the case of a video signal it will be by e.g., chroma keying.

As an alternative to the arrangement shown, the remote background selector (43) could be controlled by data sent along the associated communication channel (32) to select a remote background and combine it with the main communications channel at the cellular station (6) in an additional combiner (not shown).

The example discussed above is of course an audio communication device and combining of main and background signals will be by audio mixing in a well known manner.

If the device were a video communication device, then the combining of signals would keep on using a known technique such as chroma key or other techniques which would be known to those skilled in the art.

- 5        The system shown in figure 3 could of course be arranged to mix audio signals or combine video signals at the transmitting unit to enable the aggregate signal to be transmitted on a single communication channel.

CLAIMS:

1. A communication system comprising a plurality of communication devices; each of which may transmit signals to and receive signals from a selected one of the other devices, the system including means to remove  
5 substantially all of a background portion of a signal to be transmitted thereby producing a main signal and means to combine the main signal with a predetermined background signal for reception by one of the devices.

10 2. A communication system according to claim 1 in which each communication device comprises the means to remove substantially all of the background signal.

15 3. A communication system according to claim 1 or 2 in which each communication device comprises means to combine the predetermined background signal with the main signal.

4. A communication system according to claim 3 in which the combining means comprises means to mix the main and background signal together.

20 5. A communication system according to claim 3 in which the combining means comprises means to apply the main signal to a main communication channel and means to apply the background signal to an additional communication channel.

25 6. A communication system according to claim 5 in which each communication device comprises means for mixing together signals received on the main and additional communication channels.

7. A communication system according to any preceding claim in which the predetermined background signals are stored in a communication device.

8. A communication system according to any preceding claim in which the predetermined background signals are generated in communication devices.

9. A communication system according to any preceding claim in which the predetermined background signals are supplied externally to the communications devices.

10. A communication system according to any preceding claim in which the real time content of the background signals is synchronised to a timing device provided with a communication device.

11. A communication system according to any preceding claim in which the real time content of the background signals is synchronised to an external timing source.

12. A communication system according to any preceding claim in which the background signals are provided from a live source.

13. A communication system according to any preceding claim in which the background signal is selected in dependence on the communication device to which the call is directed.

14. A communication system according to any preceding claim in which the main and background signals comprise audio signals.

15. A communication system according to any preceding claim in which the main and background signals comprise video signals.

5 16. A communication device to transmit signals to and receive signals from selected ones of a plurality of other communication devices comprising means to remove substantially all of a background portion of a signal to be transmitted thereby producing a main signal and means to combine the main signal with a predetermined background  
10 signal for reception by a selected other communication device.

17. A personal communication system substantially as herein described.

15 18. A communication device substantially as herein described with reference to Figure 2 or 3 of the drawings.



INVESTOR IN PEOPLE

Application No: GB 0017707.1  
Claims searched: 1-18

Examiner: Iwan Thomas  
Date of search: 29 January 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): H4F FGJ, FDX; H4R RLS, RPX

Int Cl (Ed.7): H04N 5/272, 5/275, 7/14, 7/15, 9/75

Other: Online: WPI, EPODOC, JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2337654 A (SAMSUNG) See abstract and pages 2 -5	1, 2, 9, 15 and 16
X	EP 0320828 A2 (MITSUBISHI) See abstract, and col. 7 line 52 - col. 8 line 20	1-4, 7, 8, 15 and 16
X	JP 2000175166 A (CANON) See abstract	1-4, 7, 8, 15 and 16
X	JP 11261983 A (TOSHIBA) See abstract	1-4, 7, 8, 15 and 16
X	JP 10013799 A (MEGACHIPS) See abstract	1-4, 7, 8, 15 and 16
X	JP 5083703 A (SHARP) See abstract	1-4, 7, 8, 15 and 16

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